

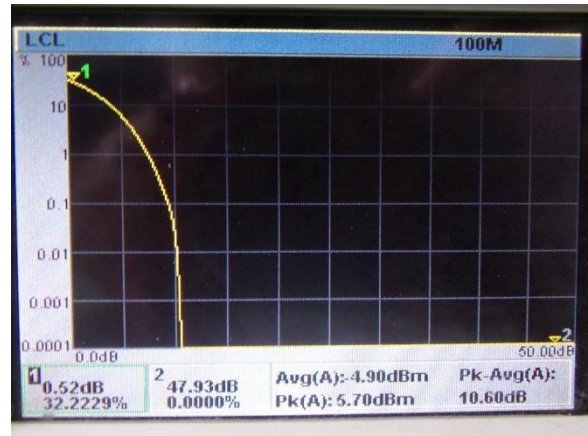


HERMON LABORATORIES

Test specification:		Section 96.41(g), Peak-to- average power ratio	
Test procedure:		Section 96.41(g)	
Test mode:		Verdict: PASS	
Date(s):			
08-Feb-22			
Temperature: 24.3. °C	Relative Humidity: 48 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

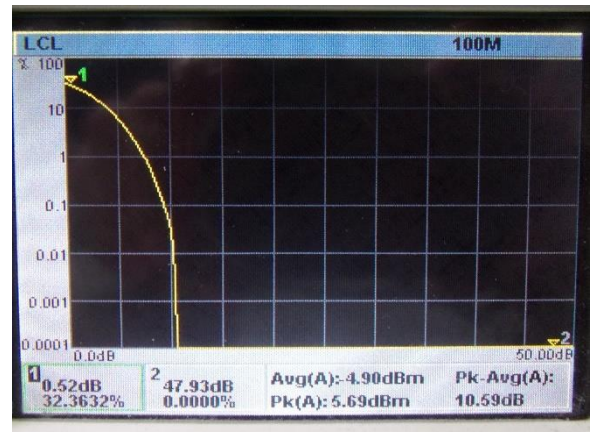
Modulation: 64QAM

LCL		
A		
10%	4.23dB	✍
1%	7.50dB	
0.1%	9.36dB	
0.01%	10.12dB	
0.001%	10.36dB	
0.0001%	10.47dB	



Modulation: 256QAM

LCL		
A		
10%	4.21dB	✍
1%	7.55dB	
0.1%	9.36dB	
0.01%	10.22dB	
0.001%	10.39dB	
0.0001%	10.50dB	





HERMON LABORATORIES

Test specification:		Section 96.41(g), Peak-to- average power ratio	
Test procedure:		Section 96.41(g)	
Test mode:		Verdict: PASS	
Date(s):			
08-Feb-22			
Temperature: 24.3. °C	Relative Humidity: 48 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

Plot 7.2.8 Peak-to-average power ratio test results at mid frequency

CHANNEL SPACING:

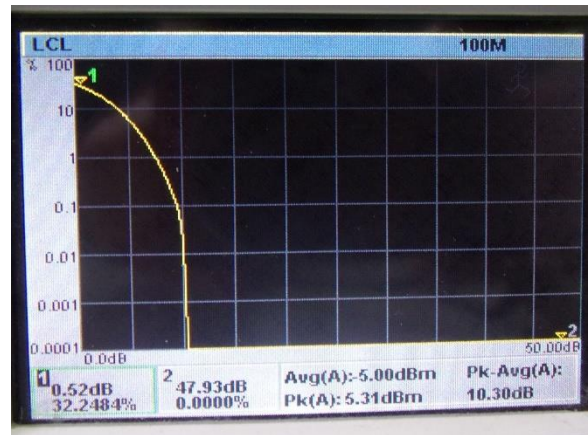
40 MHz

ANTENNA PORT:

1

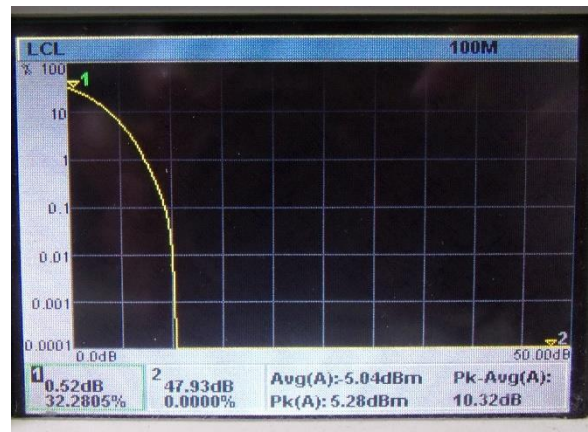
Modulation: QPSK

LCL		
A		
10%	4.20dB	✍
1%	7.51dB	
0.1%	9.46dB	
0.01%	10.06dB	
0.001%	10.18dB	
0.0001%	10.25dB	



Modulation: 16QAM

LCL		
A		
10%	4.23dB	✍
1%	7.48dB	
0.1%	9.32dB	
0.01%	10.02dB	
0.001%	10.19dB	
0.0001%	10.29dB	



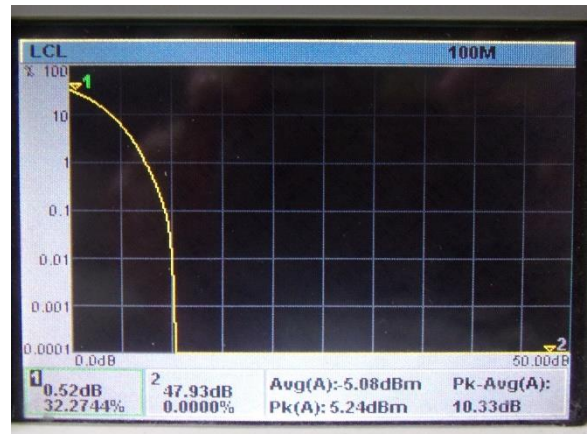


HERMON LABORATORIES

Test specification: Section 96.41(g), Peak-to- average power ratio			
Test procedure: Section 96.41(g)			
Test mode: Compliance		Verdict: PASS	
Date(s): 08-Feb-22			
Temperature: 24.3. °C	Relative Humidity: 48 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

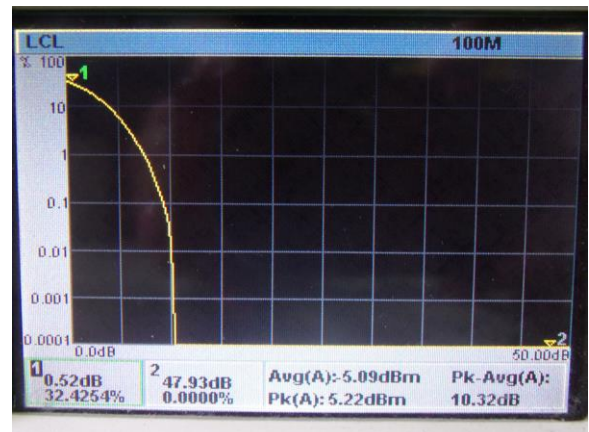
Modulation: 64QAM

10%		4.23dB	✍
1%		7.46dB	
0.1%		9.30dB	
0.01%		10.00dB	
0.001%		10.20dB	
0.0001%		10.25dB	



Modulation: 256QAM

10%		4.23dB	✍
1%		7.51dB	
0.1%		9.32dB	
0.01%		10.05dB	
0.001%		10.19dB	
0.0001%		10.26dB	





HERMON LABORATORIES

Test specification: Section 96.41(g), Peak-to- average power ratio			
Test procedure: Section 96.41(g)			
Test mode: Compliance		Verdict: PASS	
Date(s): 08-Feb-22			
Temperature: 24.3. °C	Relative Humidity: 48 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

Plot 7.2.9 Peak-to-average power ratio test results at high frequency

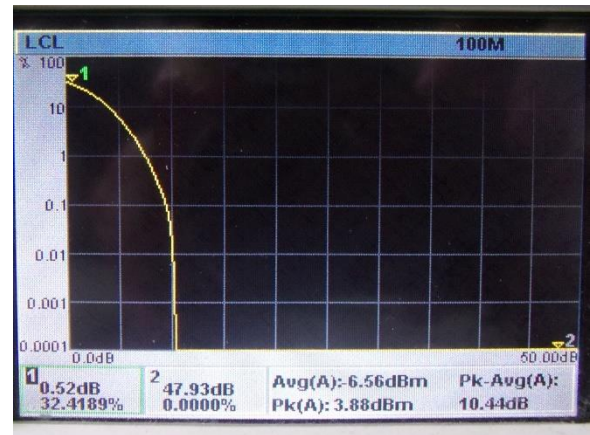
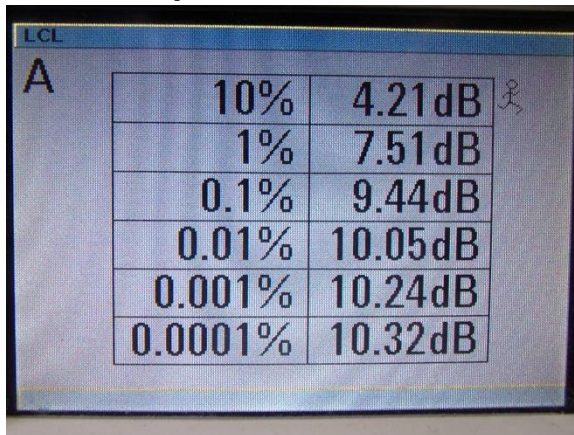
CHANNEL SPACING:

40 MHz

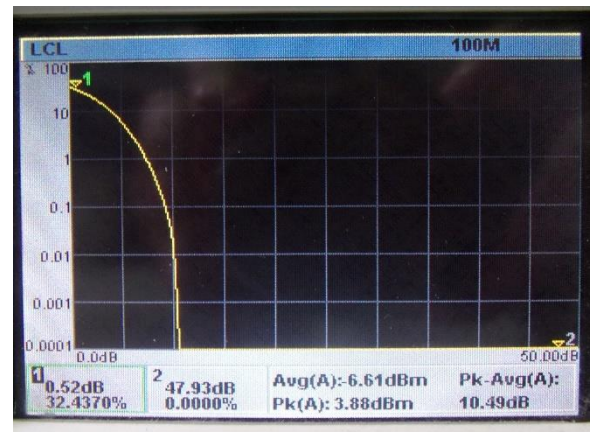
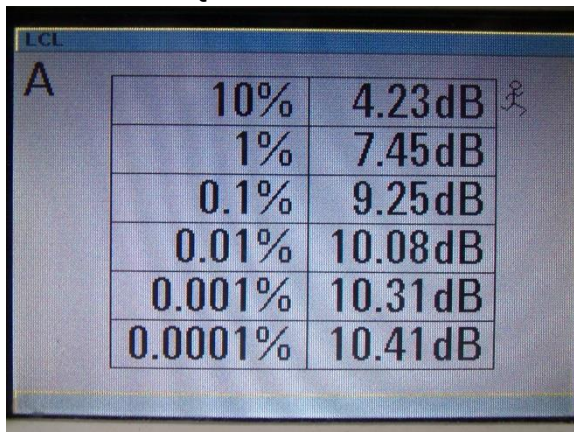
ANTENNA PORT:

1

Modulation: QPSK



Modulation: 16QAM



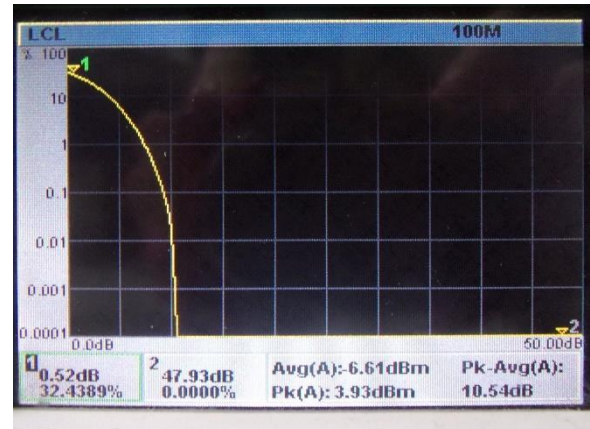


HERMON LABORATORIES

Test specification:		Section 96.41(g), Peak-to- average power ratio	
Test procedure:		Section 96.41(g)	
Test mode:		Verdict: PASS	
Date(s):			
08-Feb-22			
Temperature: 24.3. °C	Relative Humidity: 48 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

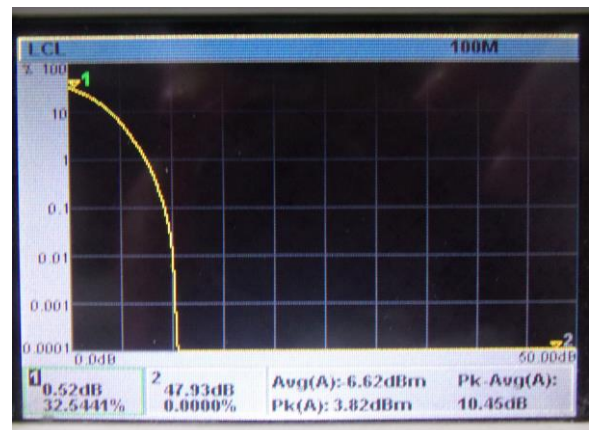
Modulation: 64QAM

LCL		
A		
10%	4.23dB	✍
1%	7.47dB	
0.1%	9.24dB	
0.01%	10.08dB	
0.001%	10.31dB	
0.0001%	10.40dB	



Modulation: 256QAM

LCL		
A		
10%	4.22dB	✍
1%	7.53dB	
0.1%	9.22dB	
0.01%	9.99dB	
0.001%	10.26dB	
0.0001%	10.35dB	





Test specification: Section2.1049, Occupied bandwidth			
Test procedure: 47 CFR, Section 2.1049			
Test mode: Compliance		Verdict: PASS	
Date(s): 14-Feb-22			
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1012 hPa	Power: 48 VAC
Remarks:			

7.3 Occupied bandwidth test

7.3.1 General

This test was performed to measure transmitter occupied bandwidth. Specification test limits are given in Table 7.3.1.

Table 7.3.1 Occupied bandwidth limits

Assigned frequency, MHz	Modulation envelope reference points*, %	Maximum allowed bandwidth, MHz
3550 - 3700	99	10 / 20 / 40 MHz

* - Modulation envelope reference points are provided in terms of attenuation below the unmodulated carrier.

7.3.2 Test procedure

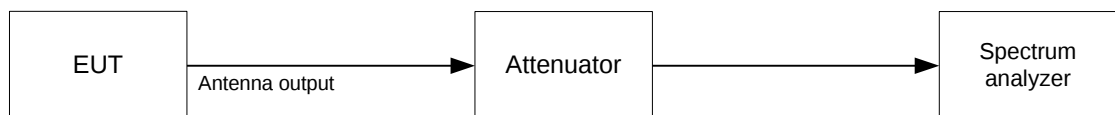
7.3.2.1 The EUT was set up as shown in Figure 7.3.1, energized and its proper operation was checked.

7.3.2.2 The EUT was set to transmit the unmodulated carrier and the reference peak power level was measured.

7.3.2.3 The EUT was set to transmit the normally modulated carrier.

7.3.2.4 The transmitter occupied bandwidth was measured with spectrum analyzer as a frequency delta between the reference points on modulation envelope and provided in Table 7.3.2 and the associated plots.

Figure 7.3.1 Occupied bandwidth test setup





Test specification: Section2.1049, Occupied bandwidth			
Test procedure: 47 CFR, Section 2.1049			
Test mode: Compliance		Verdict: PASS	
Date(s): 14-Feb-22			
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1012 hPa	Power: 48 VAC
Remarks:			

Table 7.3.2 Occupied bandwidth test results

DETECTOR USED: Peak hold
 RESOLUTION BANDWIDTH: 1 – 5% of the OBW
 VIDEO BANDWIDTH: > RBW
 MODULATION ENVELOPE REFERENCE POINTS: 99%

Carrier frequency, MHz	Occupied bandwidth, MHz	Limit, MHz	Margin, MHz	Verdict
Channel spacing 10 MHz				
Modulation QPSK				
3555.0	8.674	10.0	-1.326	Pass
3625.0	8.661	10.0	-1.339	Pass
3695.0	8.656	10.0	-1.344	Pass
Modulation 16QAM				
3555.0	8.669	10.0	-1.331	Pass
3625.0	8.674	10.0	-1.326	Pass
3695.0	8.656	10.0	-1.344	Pass
Modulation 64QAM				
3555.0	8.641	10.0	-1.359	Pass
3625.0	8.666	10.0	-1.334	Pass
3695.0	8.656	10.0	-1.344	Pass
Modulation 256QAM				
3555.0	8.641	10.0	-1.359	Pass
3625.0	8.634	10.0	-1.366	Pass
3695.0	8.621	10.0	-1.379	Pass



HERMON LABORATORIES

Test specification: Section2.1049, Occupied bandwidth			
Test procedure: 47 CFR, Section 2.1049			
Test mode: Compliance		Verdict: PASS	
Date(s): 14-Feb-22			
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1012 hPa	Power: 48 VAC
Remarks:			

Table 7.3.3 Occupied bandwidth test results (continue)

DETECTOR USED: Peak hold
 RESOLUTION BANDWIDTH: 1 – 5% of the OBW
 VIDEO BANDWIDTH: > RBW
 MODULATION ENVELOPE REFERENCE POINTS: 99%

Channel spacing 20 MHz				
Modulation QPSK				
3560.0	18.193	20.0	-1.807	Pass
3625.0	18.188	20.0	-1.812	Pass
3690.0	18.197	20.0	-1.803	Pass
Modulation 16QAM				
3560.0	18.238	20.0	-1.762	Pass
3625.0	18.248	20.0	-1.752	Pass
3690.0	18.253	20.0	-1.747	Pass
Modulation 64QAM				
3560.0	18.253	20.0	-1.747	Pass
3625.0	18.252	20.0	-1.748	Pass
3690.0	18.243	20.0	-1.757	Pass
Modulation 256QAM				
3560.0	18.178	20.0	-1.822	Pass
3625.0	18.168	20.0	-1.832	Pass
3690.0	18.183	20.0	-1.817	Pass
Channel spacing 40 MHz				
Modulation QPSK				
3570.0	37.785	40.0	-2.215	Pass
3625.0	37.775	40.0	-2.225	Pass
3680.0	37.745	40.0	-2.255	Pass
Modulation 16QAM				
3570.0	37.785	40.0	-2.215	Pass
3625.0	37.775	40.0	-2.225	Pass
3680.0	37.765	40.0	-2.235	Pass
Modulation 64QAM				
3570.0	37.785	40.0	-2.215	Pass
3625.0	37.775	40.0	-2.225	Pass
3680.0	37.775	40.0	-2.225	Pass
Modulation 256QAM				
3570.0	37.785	40.0	-2.215	Pass
3625.0	37.765	40.0	-2.235	Pass
3680.0	37.765	40.0	-2.235	Pass

Reference numbers of test equipment used

HL 4355	HL 4366	HL 6143					
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Full description is given in Appendix A.

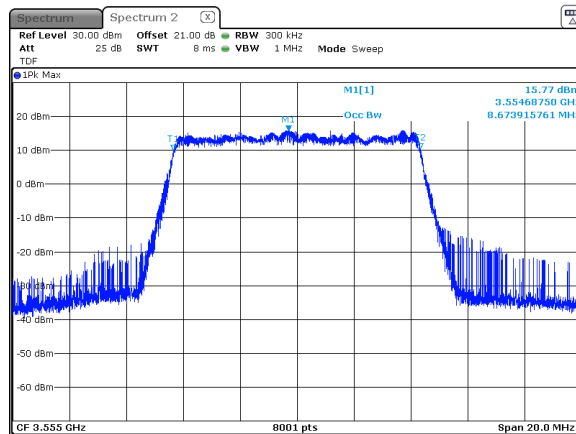


HERMON LABORATORIES

Test specification:		Section2.1049, Occupied bandwidth	
Test procedure:		47 CFR, Section 2.1049	
Test mode:		Verdict: PASS	
Date(s):			
14-Feb-22			
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1012 hPa	Power: 48 VAC
Remarks:			

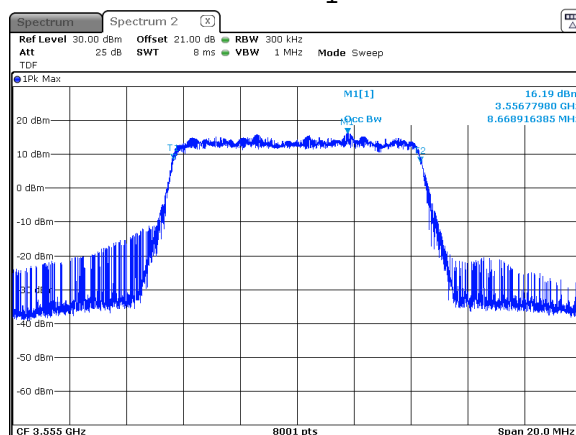
Plot 7.3.1 Occupied bandwidth test result at low frequency

MODULATION: QPSK
CHANNEL SPACING: 10 MHz
ANTENNA CHAIN: 1



Plot 7.3.2 Occupied bandwidth test result at low frequency

MODULATION: 16QAM
CHANNEL SPACING: 10 MHz
ANTENNA CHAIN: 1



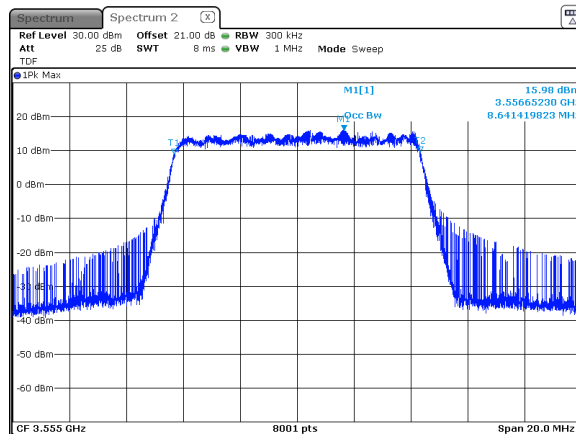


HERMON LABORATORIES

Test specification: Section2.1049, Occupied bandwidth			
Test procedure: 47 CFR, Section 2.1049			
Test mode: Compliance		Verdict: PASS	
Date(s): 14-Feb-22			
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1012 hPa	Power: 48 VAC
Remarks:			

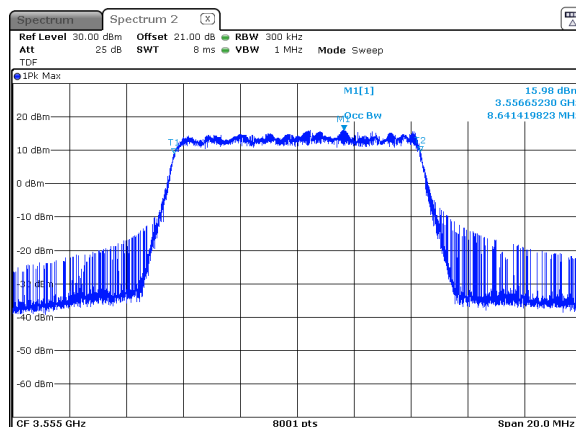
Plot 7.3.3 Occupied bandwidth test result at low frequency

MODULATION: 64QAM
CHANNEL SPACING: 10 MHz
ANTENNA CHAIN: 1



Plot 7.3.4 Occupied bandwidth test result at low frequency

MODULATION: 256QAM
CHANNEL SPACING: 10 MHz
ANTENNA CHAIN: 1



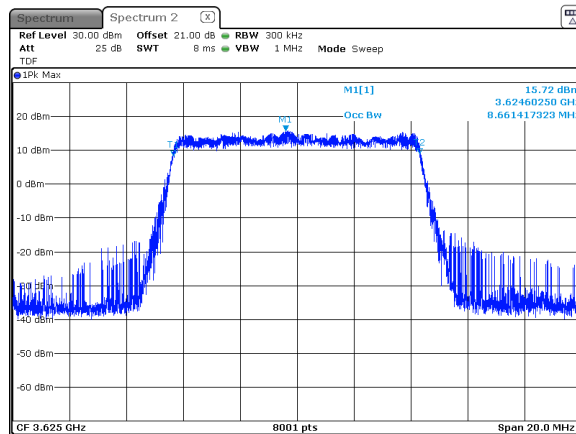


HERMON LABORATORIES

Test specification: Section2.1049, Occupied bandwidth			
Test procedure: 47 CFR, Section 2.1049			
Test mode: Compliance		Verdict: PASS	
Date(s): 14-Feb-22			
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1012 hPa	Power: 48 VAC
Remarks:			

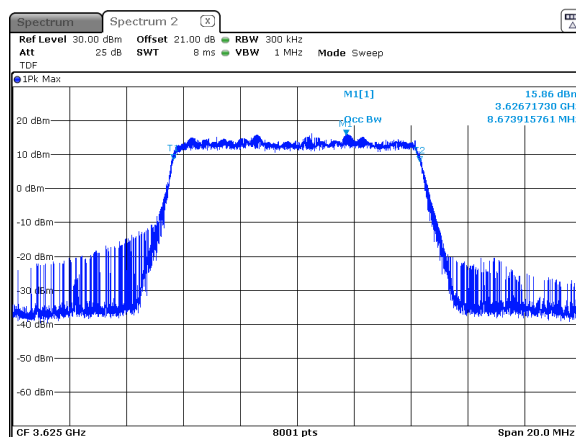
Plot 7.3.5 Occupied bandwidth test result at mid frequency

MODULATION: QPSK
CHANNEL SPACING: 10 MHz
ANTENNA CHAIN: 1



Plot 7.3.6 Occupied bandwidth test result at mid frequency

MODULATION: 16QAM
CHANNEL SPACING: 10 MHz
ANTENNA CHAIN: 1



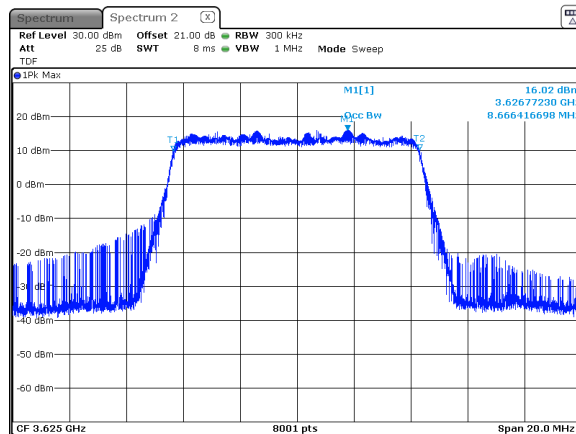


HERMON LABORATORIES

Test specification: Section2.1049, Occupied bandwidth			
Test procedure: 47 CFR, Section 2.1049			
Test mode: Compliance		Verdict: PASS	
Date(s): 14-Feb-22			
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1012 hPa	Power: 48 VAC
Remarks:			

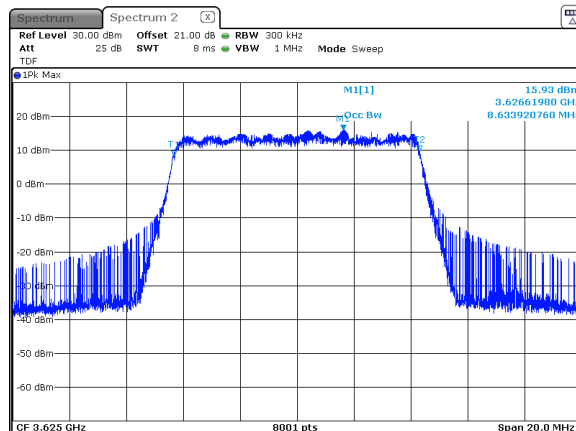
Plot 7.3.7 Occupied bandwidth test result at mid frequency

MODULATION: 64QAM
CHANNEL SPACING: 10 MHz
ANTENNA CHAIN: 1



Plot 7.3.8 Occupied bandwidth test result at mid frequency

MODULATION: 256QAM
CHANNEL SPACING: 10 MHz
ANTENNA CHAIN: 1



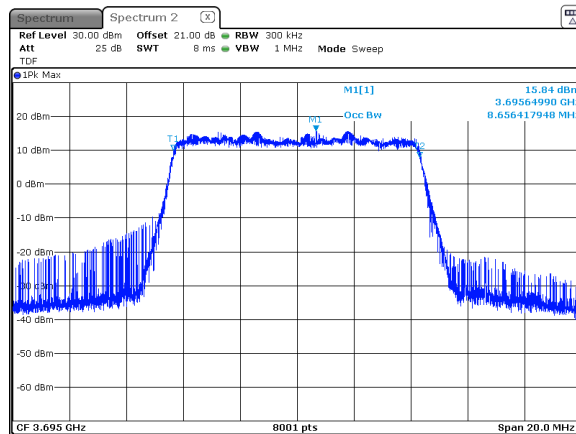


HERMON LABORATORIES

Test specification: Section2.1049, Occupied bandwidth			
Test procedure: 47 CFR, Section 2.1049			
Test mode: Compliance		Verdict: PASS	
Date(s): 14-Feb-22			
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1012 hPa	Power: 48 VAC
Remarks:			

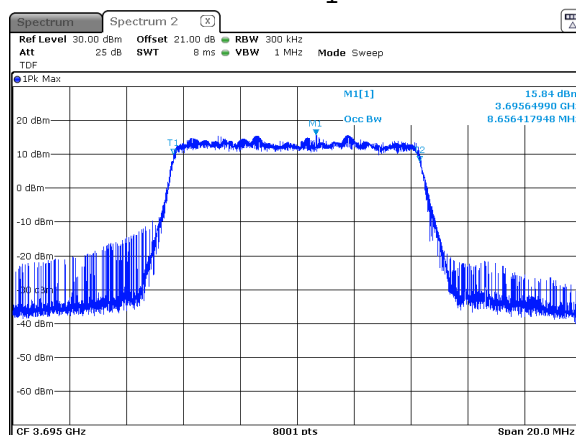
Plot 7.3.9 Occupied bandwidth test result at high frequency

MODULATION: QPSK
CHANNEL SPACING: 10 MHz
ANTENNA CHAIN: 1



Plot 7.3.10 Occupied bandwidth test result at high frequency

MODULATION: 16QAM
CHANNEL SPACING: 10 MHz
ANTENNA CHAIN: 1



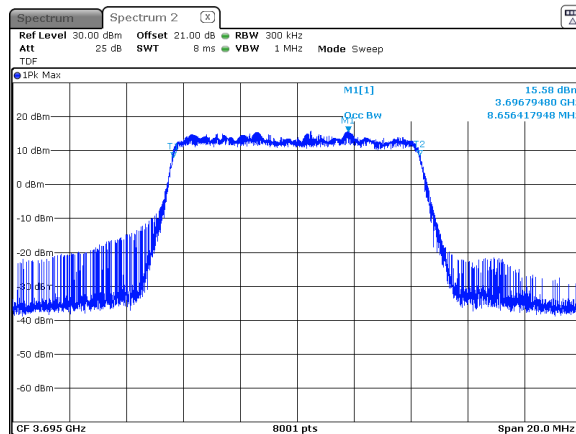


HERMON LABORATORIES

Test specification: Section2.1049, Occupied bandwidth			
Test procedure: 47 CFR, Section 2.1049			
Test mode: Compliance		Verdict: PASS	
Date(s): 14-Feb-22			
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1012 hPa	Power: 48 VAC
Remarks:			

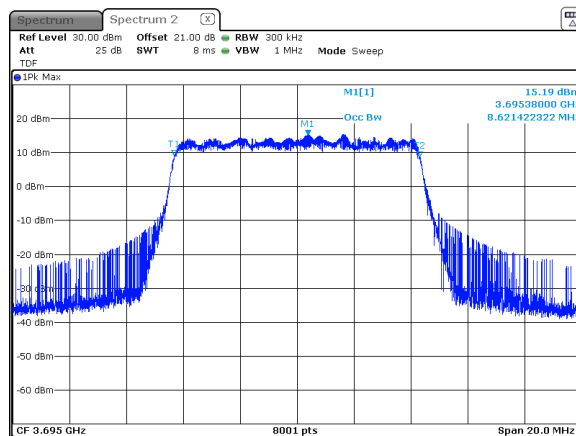
Plot 7.3.11 Occupied bandwidth test result at high frequency

MODULATION: 64QAM
CHANNEL SPACING: 10 MHz
ANTENNA CHAIN: 1



Plot 7.3.12 Occupied bandwidth test result at high frequency

MODULATION: 256QAM
CHANNEL SPACING: 10 MHz
ANTENNA CHAIN: 1



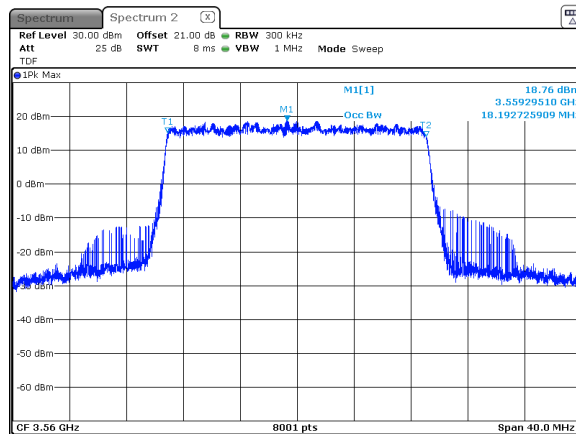


HERMON LABORATORIES

Test specification: Section2.1049, Occupied bandwidth			
Test procedure: 47 CFR, Section 2.1049			
Test mode: Compliance		Verdict: PASS	
Date(s): 14-Feb-22			
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1012 hPa	Power: 48 VAC
Remarks:			

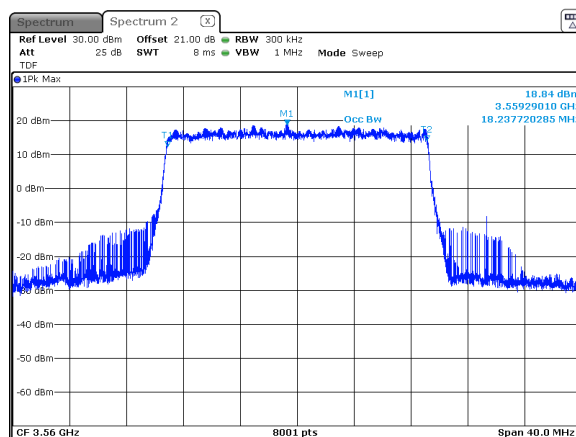
Plot 7.3.13 Occupied bandwidth test result at low frequency

MODULATION: QPSK
CHANNEL SPACING: 20 MHz
ANTENNA CHAIN: 1



Plot 7.3.14 Occupied bandwidth test result at low frequency

MODULATION: 16QAM
CHANNEL SPACING: 20 MHz
ANTENNA CHAIN: 1



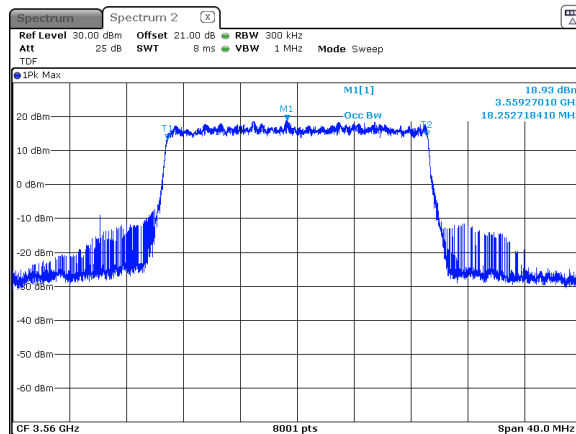


HERMON LABORATORIES

Test specification: Section2.1049, Occupied bandwidth			
Test procedure: 47 CFR, Section 2.1049			
Test mode: Compliance		Verdict: PASS	
Date(s): 14-Feb-22			
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1012 hPa	Power: 48 VAC
Remarks:			

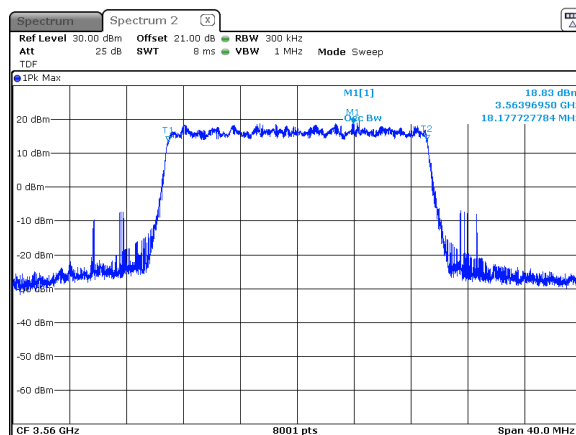
Plot 7.3.15 Occupied bandwidth test result at low frequency

MODULATION: 64QAM
CHANNEL SPACING: 20 MHz
ANTENNA CHAIN: 1



Plot 7.3.16 Occupied bandwidth test result at low frequency

MODULATION: 256QAM
CHANNEL SPACING: 20 MHz
ANTENNA CHAIN: 1



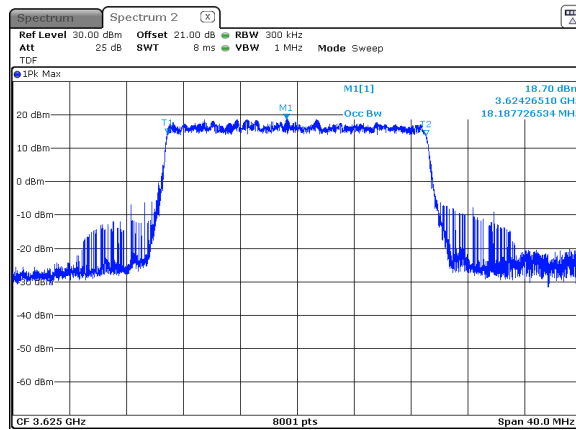


HERMON LABORATORIES

Test specification: Section2.1049, Occupied bandwidth			
Test procedure: 47 CFR, Section 2.1049			
Test mode: Compliance		Verdict: PASS	
Date(s): 14-Feb-22			
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1012 hPa	Power: 48 VAC
Remarks:			

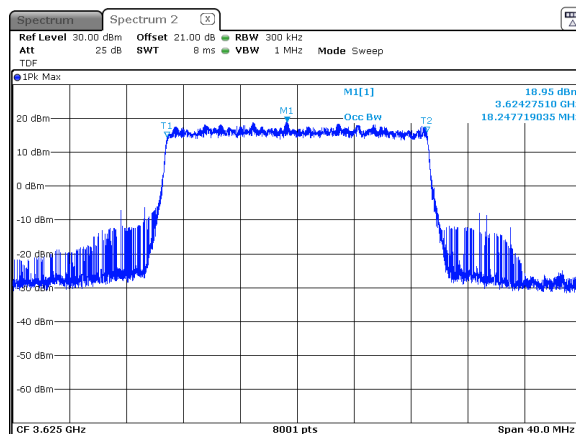
Plot 7.3.17 Occupied bandwidth test result at mid frequency

MODULATION: QPSK
CHANNEL SPACING: 20 MHz
ANTENNA CHAIN: 1



Plot 7.3.18 Occupied bandwidth test result at mid frequency

MODULATION: 16QAM
CHANNEL SPACING: 20 MHz
ANTENNA CHAIN: 1



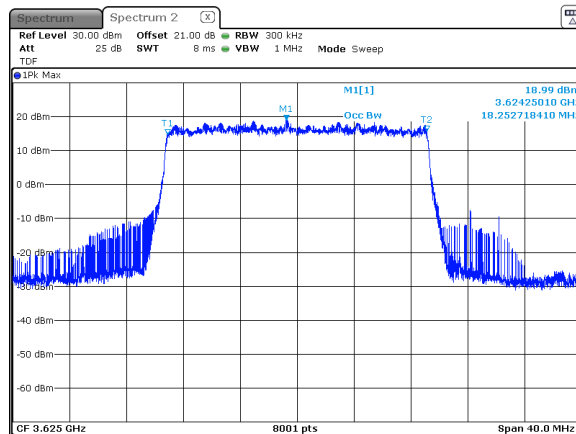


HERMON LABORATORIES

Test specification: Section2.1049, Occupied bandwidth			
Test procedure: 47 CFR, Section 2.1049			
Test mode: Compliance		Verdict: PASS	
Date(s): 14-Feb-22			
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1012 hPa	Power: 48 VAC
Remarks:			

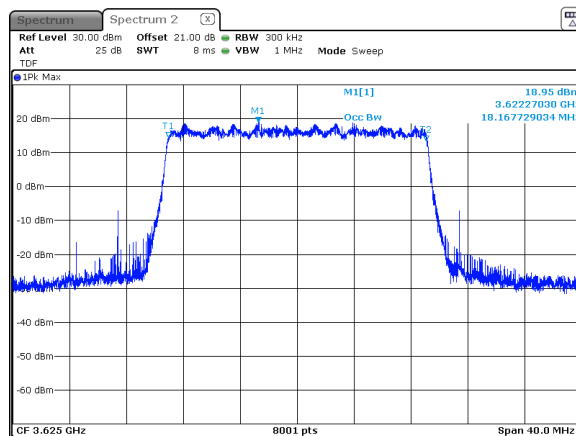
Plot 7.3.19 Occupied bandwidth test result at mid frequency

MODULATION: 64QAM
CHANNEL SPACING: 20 MHz
ANTENNA CHAIN: 1



Plot 7.3.20 Occupied bandwidth test result at mid frequency

MODULATION: 256QAM
CHANNEL SPACING: 20 MHz
ANTENNA CHAIN: 1



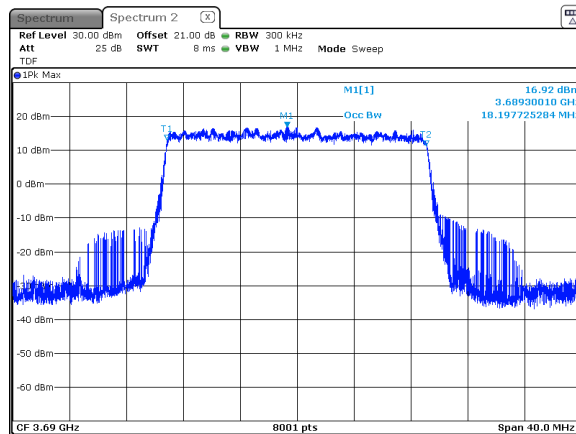


HERMON LABORATORIES

Test specification: Section2.1049, Occupied bandwidth			
Test procedure: 47 CFR, Section 2.1049			
Test mode: Compliance		Verdict: PASS	
Date(s): 14-Feb-22			
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1012 hPa	Power: 48 VAC
Remarks:			

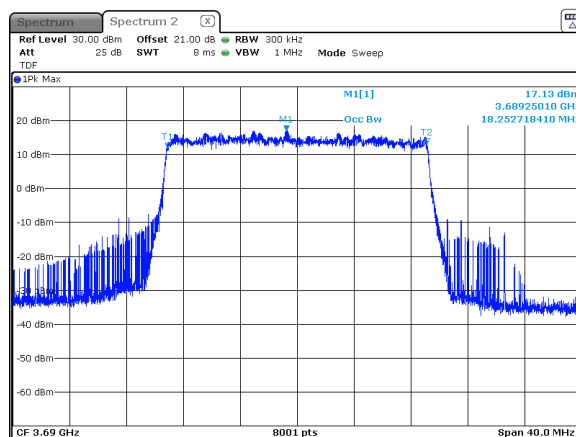
Plot 7.3.21 Occupied bandwidth test result at high frequency

MODULATION: QPSK
CHANNEL SPACING: 20 MHz
ANTENNA CHAIN: 1



Plot 7.3.22 Occupied bandwidth test result at high frequency

MODULATION: 16QAM
CHANNEL SPACING: 20 MHz
ANTENNA CHAIN: 1



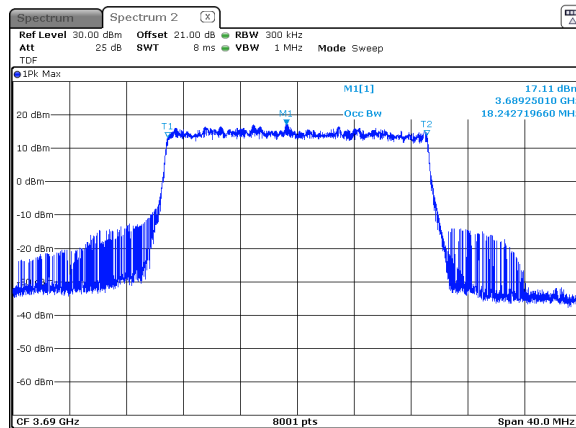


HERMON LABORATORIES

Test specification: Section2.1049, Occupied bandwidth			
Test procedure: 47 CFR, Section 2.1049			
Test mode: Compliance		Verdict: PASS	
Date(s): 14-Feb-22			
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1012 hPa	Power: 48 VAC
Remarks:			

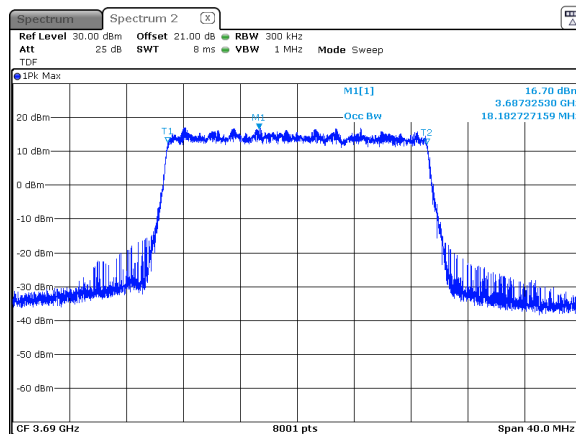
Plot 7.3.23 Occupied bandwidth test result at high frequency

MODULATION: 64QAM
CHANNEL SPACING: 20 MHz
ANTENNA CHAIN: 1



Plot 7.3.24 Occupied bandwidth test result at high frequency

MODULATION: 256QAM
CHANNEL SPACING: 20 MHz
ANTENNA CHAIN: 1



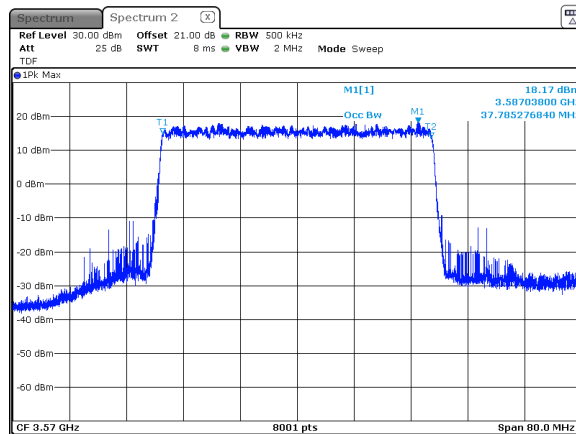


HERMON LABORATORIES

Test specification: Section2.1049, Occupied bandwidth			
Test procedure: 47 CFR, Section 2.1049			
Test mode: Compliance		Verdict: PASS	
Date(s): 14-Feb-22			
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1012 hPa	Power: 48 VAC
Remarks:			

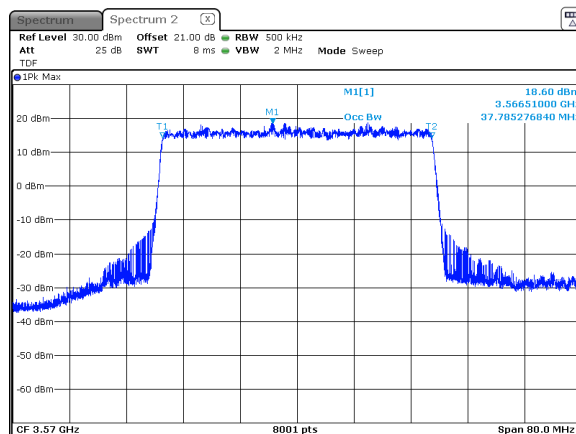
Plot 7.3.25 Occupied bandwidth test result at low frequency

MODULATION: QPSK
CHANNEL SPACING: 40 MHz
ANTENNA CHAIN: 1



Plot 7.3.26 Occupied bandwidth test result at low frequency

MODULATION: 16QAM
CHANNEL SPACING: 40 MHz
ANTENNA CHAIN: 1



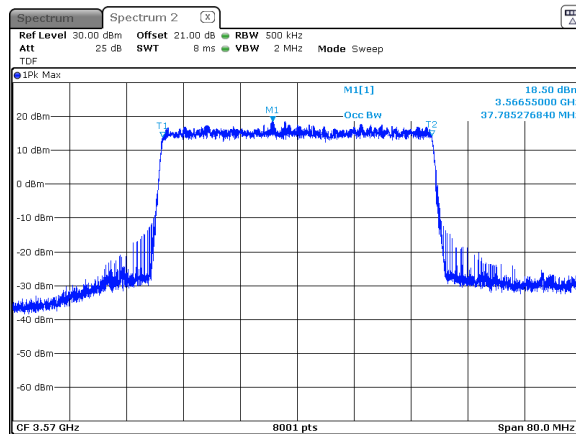


HERMON LABORATORIES

Test specification: Section2.1049, Occupied bandwidth			
Test procedure: 47 CFR, Section 2.1049			
Test mode: Compliance		Verdict: PASS	
Date(s): 14-Feb-22			
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1012 hPa	Power: 48 VAC
Remarks:			

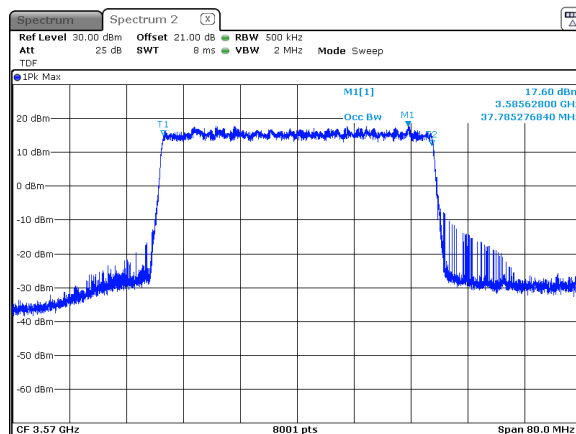
Plot 7.3.27 Occupied bandwidth test result at low frequency

MODULATION: 64QAM
CHANNEL SPACING: 40 MHz
ANTENNA CHAIN: 1



Plot 7.3.28 Occupied bandwidth test result at low frequency

MODULATION: 256QAM
CHANNEL SPACING: 40 MHz
ANTENNA CHAIN: 1



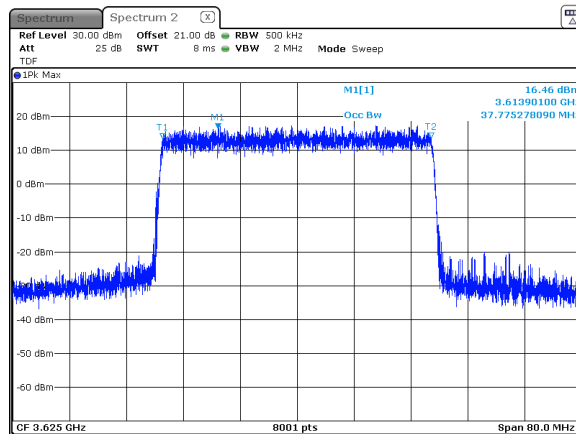


HERMON LABORATORIES

Test specification: Section2.1049, Occupied bandwidth			
Test procedure: 47 CFR, Section 2.1049			
Test mode: Compliance		Verdict: PASS	
Date(s): 14-Feb-22			
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1012 hPa	Power: 48 VAC
Remarks:			

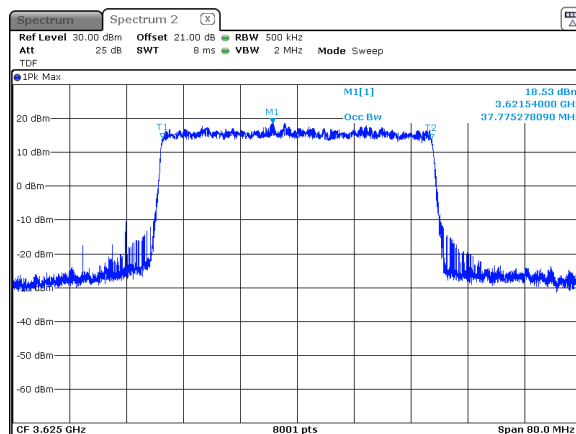
Plot 7.3.29 Occupied bandwidth test result at mid frequency

MODULATION: QPSK
CHANNEL SPACING: 40 MHz
ANTENNA CHAIN: 1



Plot 7.3.30 Occupied bandwidth test result at mid frequency

MODULATION: 16QAM
CHANNEL SPACING: 40 MHz
ANTENNA CHAIN: 1



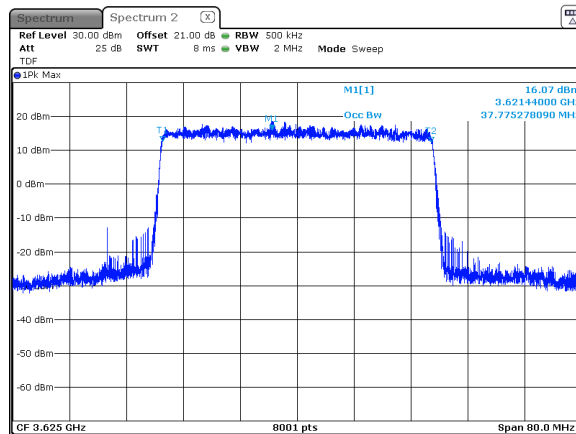


HERMON LABORATORIES

Test specification: Section2.1049, Occupied bandwidth			
Test procedure: 47 CFR, Section 2.1049			
Test mode: Compliance		Verdict: PASS	
Date(s): 14-Feb-22			
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1012 hPa	Power: 48 VAC
Remarks:			

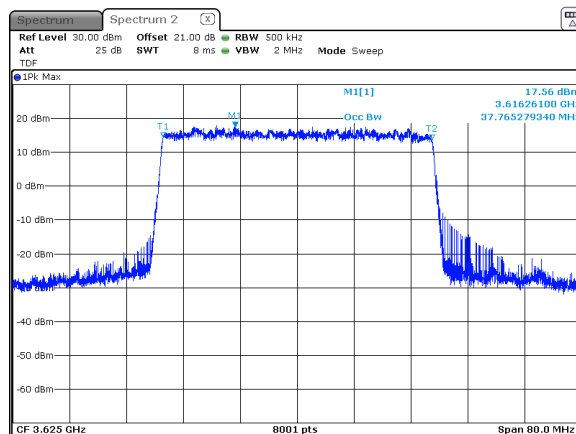
Plot 7.3.31 Occupied bandwidth test result at mid frequency

MODULATION: 64QAM
CHANNEL SPACING: 40 MHz
ANTENNA CHAIN: 1



Plot 7.3.32 Occupied bandwidth test result at mid frequency

MODULATION: 256QAM
CHANNEL SPACING: 40 MHz
ANTENNA CHAIN: 1



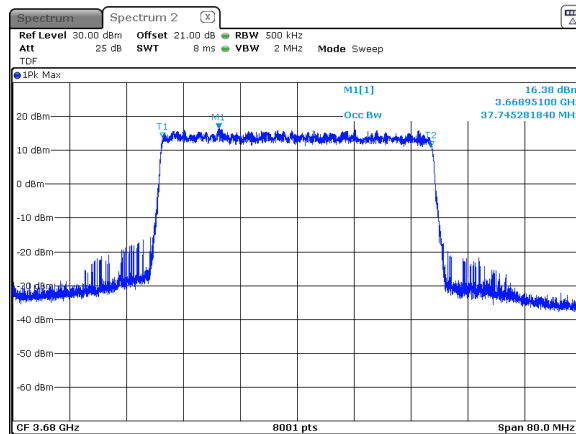


HERMON LABORATORIES

Test specification: Section2.1049, Occupied bandwidth			
Test procedure: 47 CFR, Section 2.1049			
Test mode: Compliance		Verdict: PASS	
Date(s): 14-Feb-22			
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1012 hPa	Power: 48 VAC
Remarks:			

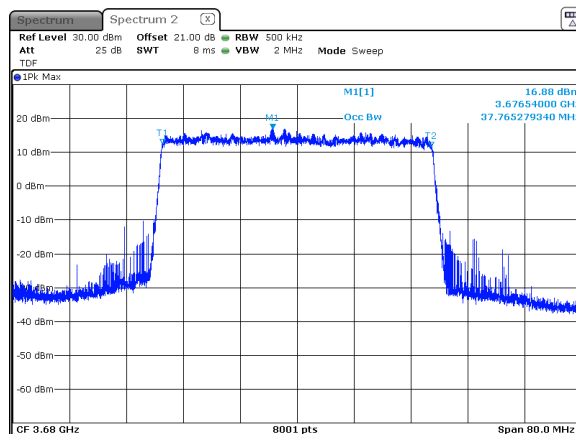
Plot 7.3.33 Occupied bandwidth test result at high frequency

MODULATION: QPSK
CHANNEL SPACING: 40 MHz
ANTENNA CHAIN: 1



Plot 7.3.34 Occupied bandwidth test result at high frequency

MODULATION: 16QAM
CHANNEL SPACING: 40 MHz
ANTENNA CHAIN: 1



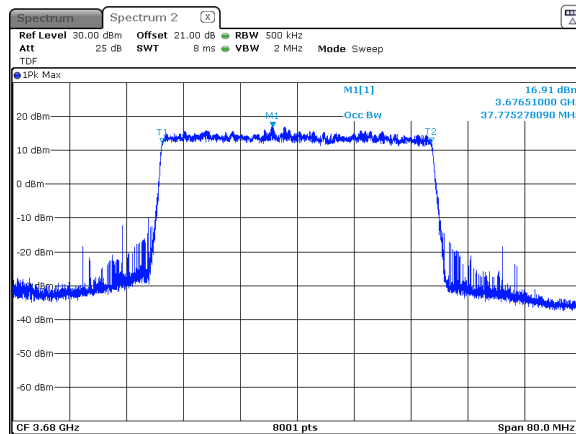


HERMON LABORATORIES

Test specification: Section2.1049, Occupied bandwidth			
Test procedure: 47 CFR, Section 2.1049			
Test mode: Compliance		Verdict: PASS	
Date(s): 14-Feb-22			
Temperature: 24 °C	Relative Humidity: 52 %	Air Pressure: 1012 hPa	Power: 48 VAC
Remarks:			

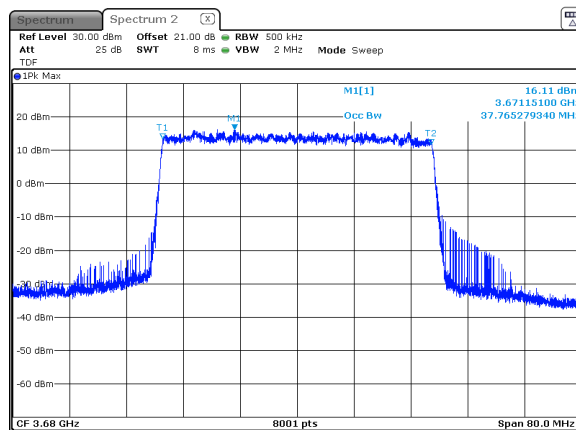
Plot 7.3.35 Occupied bandwidth test result at high frequency

MODULATION: 64QAM
CHANNEL SPACING: 40 MHz
ANTENNA CHAIN: 1



Plot 7.3.36 Occupied bandwidth test result at high frequency

MODULATION: 256QAM
CHANNEL SPACING: 40 MHz
ANTENNA CHAIN: 1





Test specification: Section 96.41(e), Emission mask			
Test procedure: Section 96.41(e)(3)			
Test mode: Compliance		Verdict: PASS	
Date(s): 15-Feb-22			
Temperature: 24.2 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

7.4 Emission outside the fundamental test

7.4.1 General

This test was performed to measure Emission outside the fundamental at RF antenna connector. Specification test limits are given in Table 7.4.1.

Table 7.4.1 Emission outside the fundamental limits

Frequency displacement from frequency block	Limit*, dBm/MHz	RBW, kHz
Channel Spacing 10 MHz		
0 – 1 MHz	- 13	100
0 – 10 MHz	- 13	1000
10 – 20 MHz	- 25	1000
Above 3530 MHz and below 3720 MHz	- 25	1000
Below 3530 MHz and above 3720 MHz	- 40	1000
Channel Spacing 20 MHz		
0 – 1 MHz	- 13	200
0 – 10 MHz	- 13	1000
10 – 20 MHz	- 25	1000
Above 3530 MHz and below 3720 MHz	- 25	1000
Below 3530 MHz and above 3720 MHz	- 40	1000
Channel Spacing 40 MHz		
0 – 1 MHz	- 13	400
0 – 10 MHz	- 13	1000
10 – 20 MHz	- 25	1000
Above 3530 MHz and below 3720 MHz	- 25	1000
Below 3530 MHz and above 3720 MHz	- 40	1000

* - Limit at each antenna connector (amount of antennas N = 4)

7.4.2 Test procedure

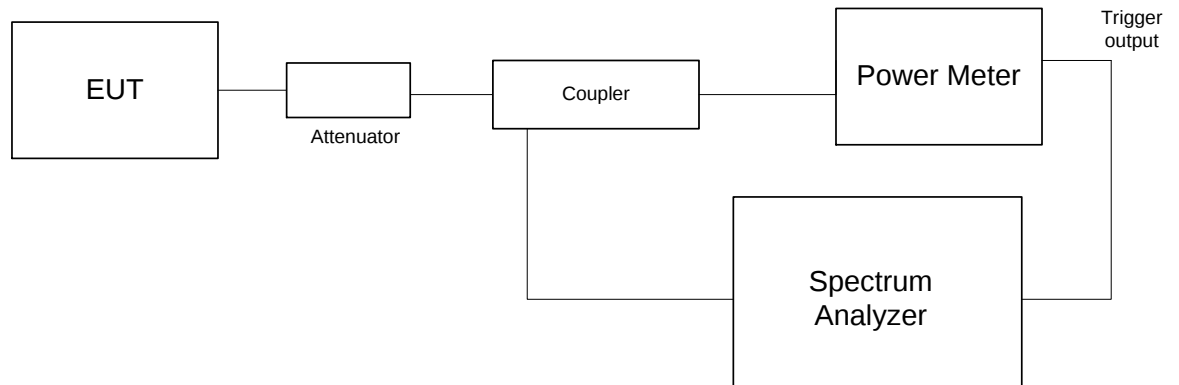
7.4.2.1 The EUT was set up as shown in Figure 7.4.1, energized and its proper operation was checked.

7.4.2.2 The Emission outside the fundamental was measured with spectrum analyzer as provided in Table 7.4.2, Table 7.4.3 and the the associated plots.



Test specification: Section 96.41(e), Emission mask			
Test procedure: Section 96.41(e)(3)			
Test mode: Compliance		Verdict: PASS	
Date(s): 15-Feb-22			
Temperature: 24.2 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

Figure 7.4.1 Emission outside the fundamental test setup





Test specification:		Section 96.41(e), Emission mask	
Test procedure:		Section 96.41(e)(3)	
Test mode:		Verdict: PASS	
Date(s):			
15-Feb-22			
Temperature: 24.2 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

Table 7.4.2 Emission outside the fundamental test results

ASSIGNED FREQUENCY RANGE: 3550.0 –3700.0 MHz
 DETECTOR USED: Average (gated)
 VIDEO BANDWIDTH: ≥ Resolution bandwidth
 NUMBER OF CHAINS: 2
 ANTENNA PORT: Worst case
 CHANNEL SPACING: 10MHz

Frequency MHz	Band edge	SA reading over 1 chain, dBm	Total band edge*, dBm	RBW, kHz	Limit, dBm	Margin, dB	Verdict
QPSK							
Low frequency 3555.0 MHz							
3530.00	Low	-57.21	-54.21	1000	-40	-14.21	Pass
3540.00	Low	-46.61	-43.61	1000	-25	-18.61	
3549.00	Low	-26.69	-23.69	1000	-13	-10.69	
3550.00	Low	-35.80	-32.80	100	-13	-19.80	
3560.00	High	-34.23	-31.23	100	-13	-18.23	
3561.00	High	-28.84	-25.84	1000	-13	-12.84	
3570.00	High	-42.74	-39.74	1000	-25	-14.74	
3720.00	High	-57.03	-54.03	1000	-40	-14.03	
Mid frequency 3625.0 MHz							
3530.00	Low	-57.51	-54.51	1000	-40	-14.51	Pass
3610.00	Low	-45.29	-42.29	1000	-25	-17.29	
3619.00	Low	-26.08	-23.08	1000	-13	-10.08	
3620.00	Low	-33.61	-30.61	100	-13	-17.61	
3630.00	High	-33.96	-30.96	100	-13	-17.96	
3631.00	High	-27.54	-24.54	1000	-13	-11.54	
3640.00	High	-43.68	-40.68	1000	-25	-15.68	
3720.00	High	-57.26	-54.26	1000	-40	-14.26	
High frequency 3695.0 MHz							
3530.00	Low	-57.48	-54.48	1000	-40	-14.48	Pass
3680.00	Low	-44.26	-41.26	1000	-25	-16.26	
3689.00	Low	-29.49	-26.49	1000	-13	-13.49	
3690.00	Low	-35.30	-32.30	100	-13	-19.30	
3700.00	High	-36.79	-33.79	100	-13	-20.79	
3701.00	High	-28.44	-25.44	1000	-13	-12.44	
3710.00	High	-45.67	-42.67	1000	-25	-17.67	
3720.00	High	-57.12	-54.12	1000	-40	-14.12	



HERMON LABORATORIES

Test specification: Section 96.41(e), Emission mask			
Test procedure: Section 96.41(e)(3)			
Test mode: Compliance		Verdict: PASS	
Date(s): 15-Feb-22			
Temperature: 24.2 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

Table 7.4.3 Emission outside the fundamental test results (continue)

ASSIGNED FREQUENCY RANGE: 3550.0 –3700.0 MHz
 DETECTOR USED: Average (gated)
 VIDEO BANDWIDTH: ≥ Resolution bandwidth
 NUMBER OF CHAINS: 2
 ANTENNA PORT: Worst case
 CHANNEL SPACING: 10MHz

Frequency MHz	Band edge	SA reading over 1 chain, dBm	Total band edge*, dBm	RBW, kHz	Limit, dBm	Margin, dB	Verdict
256 QAM							
Low frequency 3555.0 MHz							
3530.00	Low	-57.32	-54.32	1000	-40	-14.32	Pass
3540.00	Low	-47.60	-44.60	1000	-25	-19.60	
3549.00	Low	-26.69	-23.69	1000	-13	-10.69	
3550.00	Low	-36.61	-33.61	100	-13	-20.61	
3560.00	High	-35.00	-32.00	100	-13	-19.00	
3561.00	High	-29.17	-26.17	1000	-13	-13.17	
3570.00	High	-44.16	-41.16	1000	-25	-16.16	
3720.00	High	-57.46	-54.46	1000	-40	-14.46	
Mid frequency 3625.0 MHz							
3530.00	Low	-57.57	-54.57	1000	-40	-14.57	Pass
3610.00	Low	-46.15	-43.15	1000	-25	-18.15	
3619.00	Low	-26.67	-23.67	1000	-13	-10.67	
3620.00	Low	-36.92	-33.92	100	-13	-20.92	
3630.00	High	-35.25	-32.25	100	-13	-19.25	
3631.00	High	-27.79	-24.79	1000	-13	-11.79	
3640.00	High	-44.85	-41.85	1000	-25	-16.85	
3720.00	High	-57.34	-54.34	1000	-40	-14.34	
High frequency 3695.0 MHz							
3530.00	Low	-57.66	-54.66	1000	-40	-14.66	Pass
3680.00	Low	-45.17	-42.17	1000	-25	-17.17	
3689.00	Low	-29.69	-26.69	1000	-13	-13.69	
3690.00	Low	-35.45	-32.45	100	-13	-19.45	
3700.00	High	-36.42	-33.42	100	-13	-20.42	
3701.00	High	-28.71	-25.71	1000	-13	-12.71	
3710.00	High	-46.31	-43.31	1000	-25	-18.31	
3720.00	High	-56.98	-53.98	1000	-40	-13.98	

* - SA Reading over 1 chain = Max SA reading (Chains #1&2)

** - Total band edge = Maximum SA Reading over 1 chain + 10*log(N) = SA reading +3 dB

*** - Margin = Total band edge – Specification limit



Test specification: Section 96.41(e), Emission mask			
Test procedure: Section 96.41(e)(3)			
Test mode: Compliance		Verdict: PASS	
Date(s): 15-Feb-22			
Temperature: 24.2 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

Table 7.4.4 Emission outside the fundamental test results

ASSIGNED FREQUENCY RANGE: 3550.0 –3700.0 MHz
 DETECTOR USED: Average (gated)
 VIDEO BANDWIDTH: ≥ Resolution bandwidth
 NUMBER OF CHAINS: 2
 ANTENNA PORT: Worst case
 CHANNEL SPACING: 20MHz

Frequency MHz	Band edge	SA reading over 1 chain, dBm	Total band edge*, dBm	RBW, kHz	Limit, dBm	Margin, dB	Verdict
QPSK							
Low frequency 3560.0 MHz							
3530.00	Low	-51.60	-48.60	1000	-40	-8.60	Pass
3540.00	Low	-40.36	-37.36	1000	-25	-12.36	
3549.00	Low	-30.50	-27.50	1000	-13	-14.50	
3550.00	Low	-33.24	-30.24	200	-13	-17.24	
3570.00	High	-32.71	-29.71	200	-13	-16.71	
3571.00	High	-30.59	-27.59	1000	-13	-14.59	
3580.00	High	-41.46	-38.46	1000	-25	-13.46	
3720.00	High	-51.51	-48.51	1000	-40	-8.51	
Mid frequency 3625.0 MHz							
3530.00	Low	-51.63	-48.63	1000	-40	-8.63	Pass
3605.00	Low	-39.34	-36.34	1000	-25	-11.34	
3614.00	Low	-31.20	-28.20	1000	-13	-15.20	
3615.00	Low	-32.72	-29.72	200	-13	-16.72	
3635.00	High	-32.74	-29.74	200	-13	-16.74	
3636.00	High	-32.33	-29.33	1000	-13	-16.33	
3645.00	High	-40.07	-37.07	1000	-25	-12.07	
3720.00	High	-51.58	-48.58	1000	-40	-8.58	
High frequency 3690.0 MHz							
3530.00	Low	-51.77	-48.77	1000	-40	-8.77	Pass
3670.00	Low	-38.89	-35.89	1000	-25	-10.89	
3679.00	Low	-32.82	-29.82	1000	-13	-16.82	
3680.00	Low	-31.68	-28.68	200	-13	-15.68	
3700.00	High	-32.44	-29.44	200	-13	-16.44	
3701.00	High	-33.81	-30.81	1000	-13	-17.81	
3710.00	High	-41.84	-38.84	1000	-25	-13.84	
3720.00	High	-50.84	-47.84	1000	-40	-7.84	



HERMON LABORATORIES

Test specification: Section 96.41(e), Emission mask			
Test procedure: Section 96.41(e)(3)			
Test mode: Compliance		Verdict: PASS	
Date(s): 15-Feb-22			
Temperature: 24.2 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

Table 7.4.5 Emission outside the fundamental test results (continue)

ASSIGNED FREQUENCY RANGE: 3550.0 –3700.0 MHz
DETECTOR USED: Average (gated)
VIDEO BANDWIDTH: ≥ Resolution bandwidth
NUMBER OF CHAINS: 2
ANTENNA PORT: Worst case
CHANNEL SPACING: 20MHz

Frequency MHz	Band edge	SA reading over 1 chain, dBm	Total band edge*, dBm	RBW, kHz	Limit, dBm	Margin, dB	Verdict
256 QAM							
Low frequency 3560.0 MHz							
3530.00	Low	-51.32	-48.32	1000	-40	-8.32	Pass
3540.00	Low	-41.06	-38.06	1000	-25	-13.06	
3549.00	Low	-30.98	-27.98	1000	-13	-14.98	
3550.00	Low	-33.78	-30.78	200	-13	-17.78	
3570.00	High	-32.62	-29.62	200	-13	-16.62	
3571.00	High	-30.94	-27.94	1000	-13	-14.94	
3580.00	High	-41.10	-38.10	1000	-25	-13.10	
3720.00	High	-51.35	-48.35	1000	-40	-8.35	
Mid frequency 3625.0 MHz							
3530.00	Low	-51.79	-48.79	1000	-40	-8.79	Pass
3605.00	Low	-39.42	-36.42	1000	-25	-11.42	
3614.00	Low	-31.06	-28.06	1000	-13	-15.06	
3615.00	Low	-33.18	-30.18	200	-13	-17.18	
3635.00	High	-34.30	-31.30	200	-13	-18.30	
3636.00	High	-32.48	-29.48	1000	-13	-16.48	
3645.00	High	-40.93	-37.93	1000	-25	-12.93	
3720.00	High	-51.66	-48.66	1000	-40	-8.66	
High frequency 3690.0 MHz							
3530.00	Low	-51.81	-48.81	1000	-40	-8.81	Pass
3670.00	Low	-37.01	-34.01	1000	-25	-9.01	
3679.00	Low	-31.69	-28.69	1000	-13	-15.69	
3680.00	Low	-33.22	-30.22	200	-13	-17.22	
3700.00	High	-32.93	-29.93	200	-13	-16.93	
3701.00	High	-33.36	-30.36	1000	-13	-17.36	
3710.00	High	-41.49	-38.49	1000	-25	-13.49	
3720.00	High	-51.18	-48.18	1000	-40	-8.18	

* - SA Reading over 1 chain = Max SA reading (Chains #1&2)

** - Total band edge = Maximum SA Reading over 1 chain + 10*log(N) = SA reading +3 dB

*** - Margin = Total band edge – Specification limit



Test specification: Section 96.41(e), Emission mask			
Test procedure: Section 96.41(e)(3)			
Test mode: Compliance		Verdict: PASS	
Date(s): 15-Feb-22			
Temperature: 24.2 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

Table 7.4.6 Emission outside the fundamental test results

ASSIGNED FREQUENCY RANGE: 3550.0 –3700.0 MHz
 DETECTOR USED: Average (gated)
 VIDEO BANDWIDTH: ≥ Resolution bandwidth
 NUMBER OF CHAINS: 2
 ANTENNA PORT: Worst case
 CHANNEL SPACING: 40MHz

Frequency MHz	Band edge	SA reading over 1 chain, dBm	Total band edge*, dBm	RBW, kHz	Limit, dBm	Margin, dB	Verdict
QPSK							
Low frequency 3570.0 MHz							
3530.00	Low	-48.54	-45.54	1000	-40	-5.54	Pass
3540.00	Low	-38.53	-35.53	1000	-25	-10.53	
3549.00	Low	-28.16	-25.16	1000	-13	-12.16	
3550.00	Low	-25.99	-22.99	500	-13	-9.99	
3590.00	High	-27.17	-24.17	500	-13	-11.17	
3591.00	High	-26.79	-23.79	1000	-13	-10.79	
3600.00	High	-28.95	-25.95	1000	-25	-0.95	
3720.00	High	-51.41	-48.41	1000	-40	-8.41	
Mid frequency 3625.0 MHz							
3530.00	Low	-50.51	-47.51	1000	-40	-7.51	Pass
3595.00	Low	-32.88	-29.88	1000	-25	-4.88	
3604.00	Low	-29.85	-26.85	1000	-13	-13.85	
3605.00	Low	-24.93	-21.93	500	-13	-8.93	
3645.00	High	-29.33	-26.33	500	-13	-13.33	
3646.00	High	-32.53	-29.53	1000	-13	-16.53	
3655.00	High	-33.94	-30.94	1000	-25	-5.94	
3720.00	High	-50.58	-47.58	1000	-40	-7.58	
High frequency 3680.0 MHz							
3530.00	Low	-51.77	-48.77	1000	-40	-8.77	Pass
3650.00	Low	-38.02	-35.02	1000	-25	-10.02	
3659.00	Low	-32.98	-29.98	1000	-13	-16.98	
3660.00	Low	-27.45	-24.45	500	-13	-11.45	
3700.00	High	-29.00	-26.00	500	-13	-13.00	
3701.00	High	-33.81	-30.81	1000	-13	-17.81	
3710.00	High	-38.90	-35.9	1000	-25	-10.9	
3720.00	High	-49.82	-46.82	1000	-40	-6.82	



HERMON LABORATORIES

Test specification: Section 96.41(e), Emission mask			
Test procedure: Section 96.41(e)(3)			
Test mode: Compliance		Verdict: PASS	
Date(s): 15-Feb-22			
Temperature: 24.2 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

Table 7.4.7 Emission outside the fundamental test results (continue)

ASSIGNED FREQUENCY RANGE: 3550.0 –3700.0 MHz
 DETECTOR USED: Average (gated)
 VIDEO BANDWIDTH: ≥ Resolution bandwidth
 NUMBER OF CHAINS: 2
 ANTENNA PORT: Worst case
 CHANNEL SPACING: 40MHz

Frequency MHz	Band edge	SA reading over 1 chain, dBm	Total band edge*, dBm	RBW, kHz	Limit, dBm	Margin, dB	Verdict
256 QAM							
Low frequency 3570.0 MHz							
3530.00	Low	-48.87	-45.87	1000	-40	-5.87	Pass
3540.00	Low	-31.61	-28.61	1000	-25	-3.61	
3549.00	Low	-28.65	-25.65	1000	-13	-12.65	
3550.00	Low	-26.70	-23.70	500	-13	-10.70	
3590.00	High	-26.18	-23.18	500	-13	-10.18	
3591.00	High	-28.22	-25.22	1000	-13	-12.22	
3600.00	High	-28.82	-25.82	1000	-25	-0.82	
3720.00	High	-51.29	-48.29	1000	-40	-8.29	
Mid frequency 3625.0 MHz							
3530.00	Low	-50.24	-47.24	1000	-40	-7.24	Pass
3595.00	Low	-33.61	-30.61	1000	-25	-5.61	
3604.00	Low	-30.18	-27.18	1000	-13	-14.18	
3605.00	Low	-25.31	-22.31	500	-13	-9.31	
3645.00	High	-27.38	-24.38	500	-13	-11.38	
3646.00	High	-31.93	-28.93	1000	-13	-15.93	
3655.00	High	-34.20	-31.20	1000	-25	-6.20	
3720.00	High	-50.62	-47.62	1000	-40	-7.62	
High frequency 3680.0 MHz							
3530.00	Low	-51.79	-48.79	1000	-40	-8.79	Pass
3650.00	Low	-38.77	-35.77	1000	-25	-10.77	
3659.00	Low	-32.85	-29.85	1000	-13	-16.85	
3660.00	Low	-27.99	-24.99	500	-13	-11.99	
3700.00	High	-28.07	-25.07	500	-13	-12.07	
3701.00	High	-33.23	-30.23	1000	-13	-17.23	
3710.00	High	-39.35	-36.35	1000	-25	-11.35	
3720.00	High	-50.00	-47.00	1000	-40	-7.00	

* - SA Reading over 1 chain = Max SA reading (Chains #1&2)

** - Total band edge = Maximum SA Reading over 1 chain + 10*log(N) = SA reading +3 dB

*** - Margin = Total band edge – Specification limit

Reference numbers of test equipment used

HL 3301	HL 3302	HL 4355	HL 4366	HL 4425	HL 6143		
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Full description is given in Appendix A.



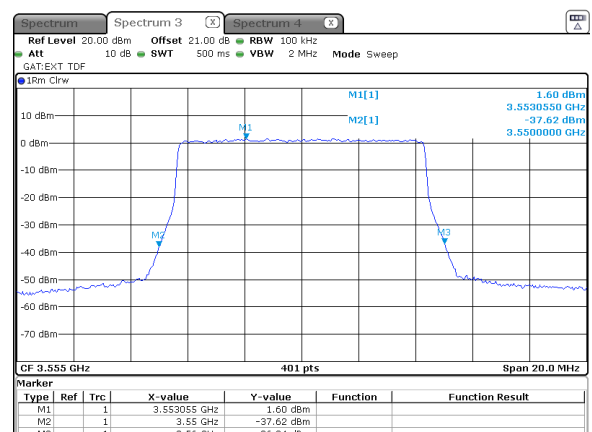
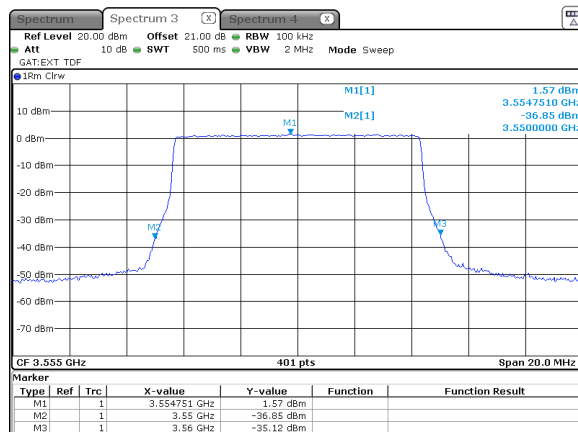
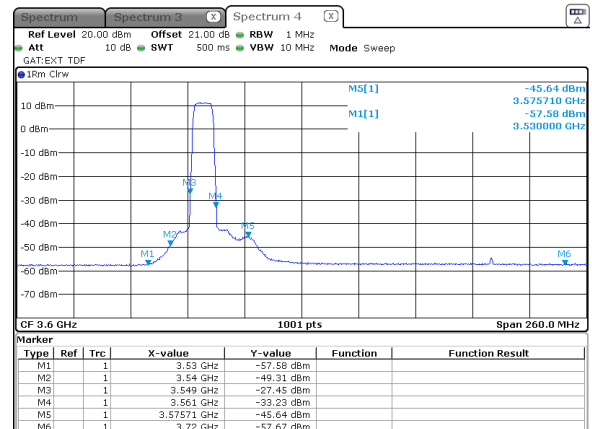
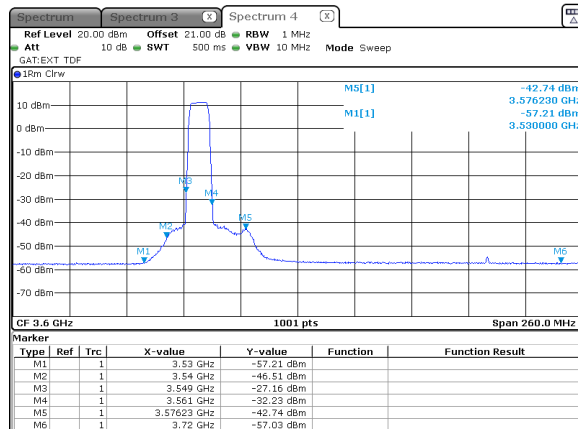
HERMON LABORATORIES

Test specification:		Section 96.41(e), Emission mask	
Test procedure:		Section 96.41(e)(3)	
Test mode:		Verdict: PASS	
Date(s):			
15-Feb-22			
Temperature: 24.2 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

Plot 7.4.1 Emission outside the fundamental test results at low carrier frequency

CHANNEL SPACING:
ANTENNA CHAIN:
Modulation: QPSK

10 MHz
1
Modulation: 256QAM





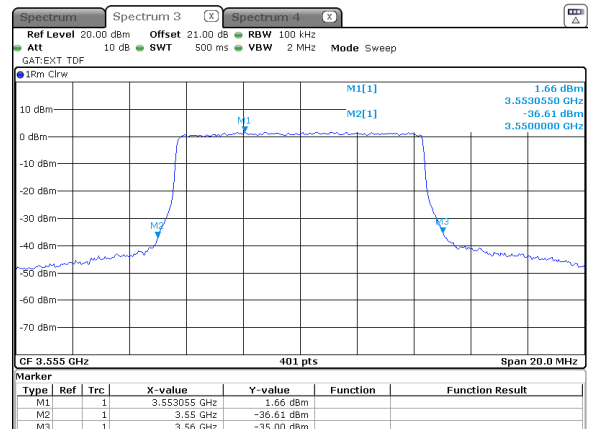
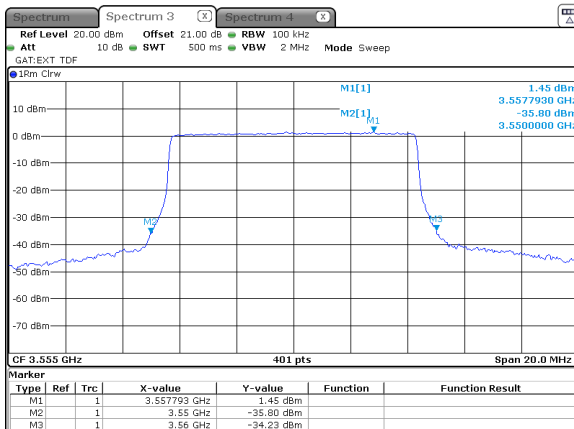
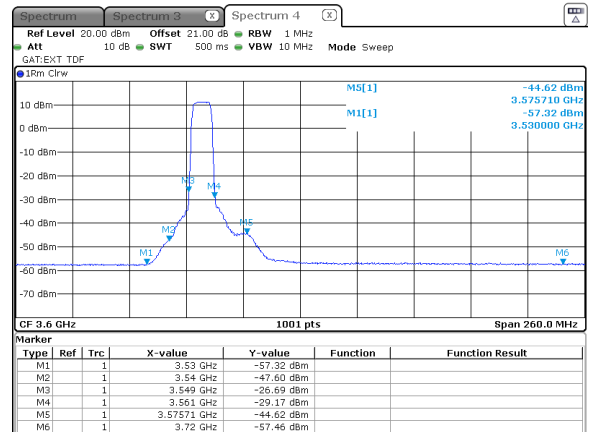
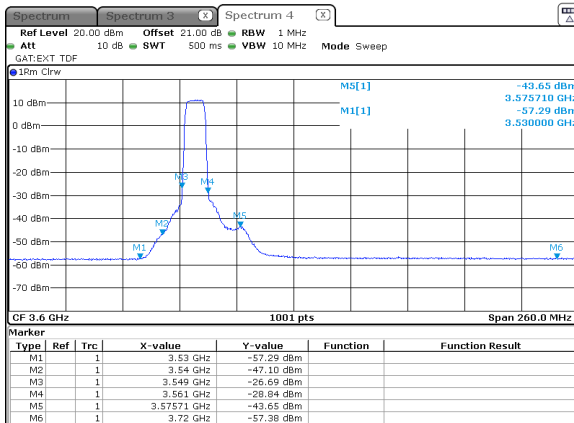
HERMON LABORATORIES

Test specification:		Section 96.41(e), Emission mask	
Test procedure:		Section 96.41(e)(3)	
Test mode:		Verdict: PASS	
Date(s):			
15-Feb-22			
Temperature: 24.2 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

Plot 7.4.2 Emission outside the fundamental test results at low carrier frequency

CHANNEL SPACING:
ANTENNA CHAIN:
Modulation: QPSK

10 MHz
2
Modulation: 256QAM





HERMON LABORATORIES

Test specification: Section 96.41(e), Emission mask			
Test procedure: Section 96.41(e)(3)			
Test mode: Compliance		Verdict: PASS	
Date(s): 15-Feb-22			
Temperature: 24.2 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 48 VAC
Remarks:			

Plot 7.4.3 Emission outside the fundamental test results at mid carrier frequency

CHANNEL SPACING:

ANTENNA CHAIN:

Modulation: QPSK

10 MHz

1

Modulation: 256QAM

